

Application No.: 10/644,821  
Examiner: David A. Rogers  
Art Unit: 2856

**AMENDMENTS TO DRAWINGS**

The sheet of drawings containing figure 8 is amended to provide a reference numeral 30a for the inlet of the aspirator 2.

## **REMARKS**

### **Objections to Specification**

The Examiner objects to certain confusing language in the specification and claims making reference to the lead-in tube connected to the aspirator using an expanded part. The Examiner contends that this language is confusing because it could lead one to believe that there may be three total parts (the lead-in tube, the connection part and the expanding (*sic*) part). The Examiner concludes, from a review of the specification and drawings that only two parts are provided, namely the lead-in tube on the expansion (*sic*) part.

Reconsideration of this objection is respectfully requested. The Examiner's attention is invited to page 17 of the SUBSTITUTE SPECIFICATION, and in particular the language beginning with the second full paragraph and continuing to the first full paragraph on page 18. The Examiner's attention is also invited to the appended annotated sheet of drawings containing figure 4 of the drawings as-filed in this application.

It will be apparent from the description and the annotations that the numeral 10 indicates the lead-in tube which is rounded in cross section in the area where the lead line from reference numeral 10 extends. The tube 10 then merges into a connection part identified as 16 which transitions between the lead-in tube 10 and the inter-connection part 15 along a smooth curve (page 17, lines 16-18). The inter-connection part 15 includes on its interior an expanded part designated as 17 which has a substantially semi-spherical shape in cross-section (page 17, lines 19, 20).

Accordingly, it will be apparent that the inter-connection part 15 is connected to the round portion of lead-in tube 10 at the connection part 16 and includes an inner expanded part 17. Thus, there are in fact three separate elements connected to the end portion of the lead-in tube 10, namely the inter-connection part 15, the connection part 16, and the expanded part 17. These parts are related in the manner described above and in the specification on pages 17 and 18.

#### Amendment to Drawings

Figure 8 of the drawings is amended to show the inlet (30a) to the aspirator tube. No new matter has been introduced by providing a reference numeral for the aspirator inlet, which is referred to in the specification and claims. Approval of the drawing amendment is respectfully requested.

#### Amendment to the Claims

Turning to the Examiner's objections, a review of the claims of the application, in particular claim 15, reveals that the language of the claim could possibly lead to an interpretation of the claim language consistent with the Examiner's observations, although it is Applicant's position that a person skilled in the art, reviewing the claim in the light of the written description and the drawings, would fully understand the nature and scope of all of the claims, including claim 15.

To avoid raising an issue with regard to the Examiner's objection, Applicant has amended claims 8, 9, 10, and 15 to avoid the objection raised by the Examiner and to clarify the language of the claims.

Claim 8, as amended, now recites that the aspirator includes an inlet and the lead-in tube is connected directly to the inlet of the aspirator through an expanded part of the lead-in tube. From the annotated figure 4 appended hereto, the position of the aspirator tube is indicated and the expanded part is identified as numeral 17. It is believed that the language of the claim clearly describes the inventive subject matter and the subject matter is further fully described in the specification and the drawings.

Claim 9 has been amended to make it more clear that the lead-in tube and the expanded part (17) are connected via a connection part (16) of the lead-in tube that defines a connection part inner wall surface (16).

Claim 10 has been amended to make it consistent with claim 9 from which it depends and to provide appropriate antecedent basis for the term "connection inner wall surface".

Claim 13 has been amended simply to reflect that the inlet of the aspirator has been previously recited in claim 8, from which this claim depends.

Claim 15 has been amended to clearly delineate the inter-connection part, the expanded part and the connection part of the lead-in tube. It is submitted that all doubt has been removed with regard to the nature and scope of the inter-connection part, the expanded part and the connection part that are shown and described in the application.

It is respectfully pointed out that the amendments proposed herein are responsive to the Examiner's objection to the specification and claims raised for the first time in the final action. Because these objections were raised for the first time in this action, Applicant did not have the opportunity to address these objections previously or to proposed the amendments presented herein.

Entry of the amendments to the specification and claims is respectfully requested at least for the purpose of placing the application in better form for appeal.

#### Rejection of Claim 8

The Examiner contends that claim 8 is unpatentable over the admitted prior art in view of U.S. 3,794,909 (Smith) and U.S. 6,585,791 (Garito et al.).

The rejection reflects the Examiner's obvious opinion that Applicant is claiming nothing more than the arrangement of a lead-in tube that provides a straight conduit leading directly to an aspirator or pump. The Examiner acknowledges that the admitted prior art does not disclose or teach a lead-in tube aligned with the rotational axis of an aspirator.

On the other hand, the Examiner contends that Smith teaches that it would amount to nothing more than an obvious expedient to align the lead-in tube of the admitted prior art with the rotational axis of the rotating part of the aspirator based on the teachings provided in Smith.

Noting that claim 8 also recites that the lead-in tube not only extends straight to the inlet of the aspirator but also is connected to the inlet through an expanded part of the lead-in tube, the Examiner relies on the teachings of Garito as a basis for concluding that the elements recited in claim 8 amount to obvious modifications and applications of the teachings of the cited prior art.

Smith 3,794,909

Smith discloses a particle sensor monitoring system utilizing a pump (42) to draw air through an inlet tube 24 that is aligned with the housing of the pump but it is not known whether or not the lead-in tube 24 is aligned with a rotational axis of the pump, which is only generally indicated at numeral 42 as a square box shape. Pump 42 is described in column 3, beginning line 50 of the patent as a "high capacity, variable speed motor/blower which is capable of drawing gas through tube 24..."

The patent describes the pump as having an inlet to which is connected a filter (44) that is removable and is an optional feature in the system.

Upstream of the pump (42) an upstream of the optional filter (44) there is provided the particle sensor (46) to which the inlet tube (24) is directly connected. Thus, the particle sensor (46) is located between the terminal end of the inlet tube (24) and the inlet of the pump (42), assuming the filter (44) is omitted. If the filter (44) is not omitted, then both the particle sensor (46) and the filter (44) are disposed between the inlet tube (24) and the pump (42).

In addition, a pre-conditioner schematically shown at (66) is provided along the tube (24) to provide heating for the gas flowing through the tube after it has passed through an upstream venturi (30).

It is clear from the above observations that Smith fails to represent a teaching combinable with the admitted prior art to result in a structural arrangement corresponding to claim 8, setting aside for the moment the limitation in claim 8 concerning the "expanded part" of the lead-in tube. The admitted prior art as shown in figures 11, 12 and 13 of this application and in particular figure 13, does not approach a structural arrangement recited in claim 8. In figure 13, the lead-in tube not only is bent to align itself with the rotational axis of the aspirator but there is no enlarged or expanded part of the lead-in tube connected to the inlet of the aspirator.

It is respectfully submitted that Smith fails to overcome the shortcomings in the admitted prior art with regard to establishing obviousness of the structural elements recited in claim 8 because the inlet tube of Smith is not directly connected to the pump (42), but rather is connected directly to a preconditioner and a particle sensor upstream

of the pump. Moreover, there is no disclosure in Smith of a rotational axis of the pump (42) or the alignment of such axis with the inlet tube.

Accordingly, it is respectfully submitted that the Examiner's suggested combination of teachings as represented by the admitted prior art in Smith fails to establish *prima facie* obviousness of claim 8, without regard for the expanded part of the lead-in tube for the moment.

Garito 6,585,791

Garito discloses the use of an expanded part to transition between an air inlet conduit and a filter housing upstream of a two-stage fan (24) that sucks air from the inlet tube, through the expanded part, through a filter in the housing and ultimately out through an outlet of the filter and fan housing.

Claim 8 recites that the lead-in tube is connected to the inlet of the aspirator through an expanded part of the lead-in tube such that the flow path expands along the traveling direction of the air. This avoids any narrowing of the air passage provided by the lead-in tube and controls pressure loss in the transition zone between the inlet of the aspirator and the inlet tube, as described in the specification.

The advantage of this arrangement is fully described on page 17, beginning with the second full paragraph. The expanded part (17) is described as resembling a substantially semi-sphere shape along the inner wall surface such that the air passage provided by the lead-in tube and the expanded part progresses along a smooth curve such that restrictions between the lead-in tube and the inlet of the aspirator, the rotational axis of which is aligned with the lead-in tube, is avoided.

In accordance with the teachings of Garito, no direct connection is provided between the inlet tube (18) and the inlet of the blower (24) but rather the expanded part is only connected to a filter housing which inherently provides resistance to air flowing from the inlet tube (18) to the inlet of the blower (24). This is entirely contrary and opposite to the intended result obtained by the structure recited in claim 8 which, as indicated above, has for its objective the avoidance of any restriction to air flow between the lead-in tube and the inlet of the aspirator.

The Examiner contends that one of ordinary skill in the art would select a connecting member between the lead-in tube and the aspirator inlet that allowed the entire inlet to the aspirator to be covered. This statement fails to recognize that an inlet to an aspirator could be the same size as an inlet tube or could be joined to an inlet tube by any number of variable configurations other than an expanded part. It is the Examiner's own opinion that leads to his conclusion, not a teaching gleaned from the cited prior art.

The Examiner also suggests that the use of a relatively small diameter lead-in tube as disclosed in the admitted prior art and in Garito et al. increases the suctioning power, thereby allowing the device of the admitted prior art in Garito et al. to pull more air using a smaller aspirator.

While this observation might be true in a context of a vacuum cleaner, it is entirely without foundation with regard to the environment of a sampling tube-type smoke detector device in which smooth air flow and avoidance of turbulence in the air flow is highly desired.

In summary, the prior art simply fails to show, teach or remotely suggest a sampling tube-type smoke detector in which a lead-in tube conveys air from a sampling tube to an aspirator having a rotating part that rotates about a rotational axis and wherein the lead-in tube is connected to the air inlet of the aspirator through an expanded part of the tube and further wherein the lead-in tube and the aspirator (and naturally the expanded part as well) are oriented with the central axis of the lead-in tube and the rotational axis of the rotating part being substantially coaxial and in alignment with the optical smoke sensor unit.

It is incumbent upon the Examiner to establish at least a *prima facie* case of obviousness which, in the present case, is not established by the admitted prior art and the additional cited art. The shortcomings in the teachings of the cited prior art are discussed in detail above and it is incumbent upon the Examiner to at the very least state his opinion as to why Applicant's arguments do not fully traverse and obviate the rejection of claim 8.

Withdrawal of the rejection of claim 8 is warranted and the same is respectfully requested.

Claims 9 and 10

Claims 9 and 10 recite the connection part of the lead-in tube as having an inner wall surface intersecting the lead-in tube inner wall surface and the expanded part in the wall surface along a smoothly contoured curve (claim 9). The inner wall surface of the connection part of the lead-in tube is recited as joining the inner wall surface of the expanded part along a smoothly curved contour having a substantially semi-spherical shape and wherein the connection part is attached to the lead-in tube adjacent to the aspirator.

The Examiner's attention is again invited to the annotated figure 4 illustration appended hereto where the various parts recited in the claim are fully labeled for the Examiner's guidance in understanding the claimed subject matter.

The Examiner, recognizing that the admitted prior art, Smith and Garito et al. fail to disclose a connection part inner wall surface as recited in the claims, views the teachings of Sinur et al. (U.S. 2003/0131891 A1) as exemplifying known surface transitions corresponding to the claimed inner wall surface contours in rejecting claims 9 and 10 on grounds of obviousness.

U.S. 2003/0131891 A1

Sinur U.S. 2003/0131891 A1 in the first place shows a transition duct contour that is completely the opposite of the contours recited in claims 9 and 10. The expanded or square part in all of the embodiments illustrated in the published application constitutes the inlet end leading to the smaller tubular outlet end that is annular in shape. Accordingly, the entire structure and function disclosed in Sinur et al. is completely contrary and opposite to the structural arrangement recited in claims 9 and 10.

The Examiner would argue that Sinur et al. is cited mainly to show smooth transition surfaces between different shapes and sizes of duct cross sections. In reply, Applicant argues that claims 9 and 10 are not concerned with merely smooth transition



contours. The recited smooth surface contours in fact bear a relationship to the direction of air flow, the location of the lead-in tube relative to the aspirator, the objective of avoiding flow restrictions and turbulence, all in the context of a sampling tube-type smoke detector having the structural elements recited in claim 8, from which claims 9 and 10 depend. Sinur tenders none of the above.

In short, the examination has failed to establish *prima facie* obviousness of claims 9 and 10.

In addition, the Examiner contends that the forming of a continuously smooth inner surface is a matter of design choice. It is pointed out to the Examiner that claims 9 and 10 do not simply recite smooth inner surfaces. Rather, the smooth inner wall surface is associated with a connection part of the lead-in tube that intersects the lead-in tube inner wall surface and expanded part inner wall surface of the connection part along a smoothly contoured curve. None of these features have been addressed by the Examiner and none of these features are described or suggested by any of the prior art relied on by the Examiner.

It is also questionable as to whether or not Sinur et al. would have any application in the context of the admitted prior art, Smith or Garito et al. As pointed out previously, Sinur et al. merely discloses and teaches a special form of transition duct work wherein a large square or rectangular duct cross section transitions into a smaller round duct cross section and wherein the large square or rectangular duct is upstream of the smaller circular duct. Clearly, this structure has no application in the environment of the Garito blower and filter and it is not seen how this structure would have any application in the admitted prior art arrangement or the particle detector system of Smith.

Withdrawal of the rejection of claims 9 and 10 appears to be warranted and the same is respectfully requested.

#### Claims 11, 12 and 15

Claims 11 and 12, recite a restrictive aperture located in the connection where the inter-connection part (15) joins the lead-in tube and wherein the aperture diaphragm opening has a diameter of 30% to 70% of the inside diameter of the lead-in tube. An

embodiment of this structure is illustrated in figure 4, for example.

The Examiner has rejected claims 11, 12 and 15 on the same ground as claims 9 and 10, and further in view of Japanese Laid-Open Patent Application JP-10267803A to Iwai.

JP-10267803A (Iwai)

Iwai discloses tubes C11 and C12 each containing a flow restrictor in the flow of an aperture plate as shown in figure 2. The Examiner states that the flow restrictors help to adjust the flow rates of air in the inlet tubes. The Examiner concludes that it would be obvious to a person of ordinary skill in the art to modify the teachings of the admitted prior art in view of Smith and Garito et al. to provide a restrictor somewhere in the prior art air conduits consistent with the teachings of Iwai to provide a restriction to air flow in the conduits.

It is respectfully submitted that claim 11 and claims 12 and 15 dependent thereon recite a structural arrangement that includes all of the structure recited in claim 8 and 9 in addition to the restricted aperture. The failure of the prior art, including Applicant's admitted prior art, to disclose, teach, or suggest the structure contained in claims 8 and 9 has been discussed above and is incorporated here by reference.

In addition, it is to be noted that the Examiner has not addressed the limitation that the restrictive aperture is located in a connection part as embodied by the connection part (15) illustrated in figure 4. That is, the Examiner has not addressed the fact that the aperture diaphragm is located in a transition region between a lead-in tube and an expanded part as embodied by expanded part (17) in figure 4. It is respectfully submitted that the Examiner's failure to address this limitation warrants withdrawal of the rejection of claims 11, 12 and 15 on grounds that the rejection fails to establish *prima facie* obviousness of the claimed subject matter due to the failure of the prior art to show or teach a material structural element recited in the claims.

Claim 15

Claim 15 recites the arrangement of an inter-connection part as embodied by

element (15) in figure 4 provided between the connection part (16) and the aspirator. The inter-connection part includes the expanded part (17) and the expanded part in turn, includes a smoothly expanded inner surface. The inter-connection part terminates at an inter-connection part outlet (13) that is larger in cross sectional area than the cross sectional area defined by the inner wall surface of the connection part (16). Also, the lead-in tube connection part, expanded part and inter-connection part are formed as one continuous integral piece.

The Examiner has not specifically stated a basis on which the rejection of claim 15 in its previous form fails to meet standards of patentability apart from the broad statements made with regard to claims 11 and 12. It is respectfully submitted that the cited prior art, including Applicant's admitted prior art, remotely shows, teaches or suggests the structural elements recited in claim 15. If the Examiner persists in maintaining the rejection of claim 15, it is respectfully requested that he state a complete basis for such rejection as required by the patent rules of practice.

#### Claim 14

Claim 14 has been indicated as containing allowable subject matter, provided that it is presented in independent form. Claim 14 has been canceled in favor of new claim 16 that corresponds to claim 14 in independent form, including all of the limitations of the base claim and intervening claims.

#### Closing Comments

It is pointed out again to the Examiner that all of the proposed amendments have to do with the form and clarity of the claims and do not raise any new issues not previously considered by the Examiner or which would require further searching and detailed consideration.

In addition, the principal basis for requesting withdrawal of the final rejection of the claims of this application lies in the fact that the Applicant's admitted prior art considered with all of the documents identified by the Examiner and relied on in the rejections fails to establish *prima facie* obviousness for the reasons discussed in detail

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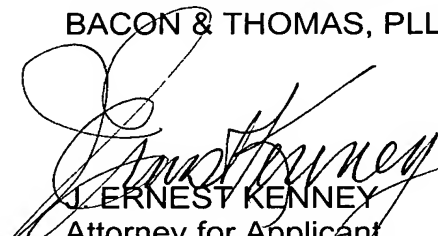
herein.

Withdrawal of the rejections and passage of the application to issue is requested.

If any issues remain that can be resolved by a telephone conference, the Examiner is invited to contact Applicant's attorney at the telephone number shown below.

Respectfully submitted,

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